

REMARKS

This Amendment is submitted with a RCE and constitutes the required submission. This Amendment is responsive to the final Office Action dated September 17, 2008. Applicant has amended the drawings and the specification. Claims 1–86 are pending.

Summary of Examiner Interview

In telephonic interviews initiated by Applicant's representative, Jessica H. Kwak, on December 15, 2008 and December 16, 2008, Applicant's attorney of record, Jessica H. Kwak, and Examiner Srivastava discussed the present application. The parties generally discussed the invention and the primary reference applied in the final Office Action, Chapoulaud et al. (U.S. Patent Application Publication No. 2002/0028417, hereinafter referred to as "Chapoulaud"). In particular, Applicant's representative requested clarification of the Examiner's characterization of the Chapoulaud reference, such as a reference number of an element in the Chapoulaud reference that the Examiner is characterizing as a planar guide.

No exhibits were introduced during the interview, and no agreement was reached with respect to the claims.

Objection to the Drawings

The drawings were objected to in the final Office Action because the drawings did not show the button, archwire, sheath, and buccal tubes of claims 38 and 74. With the present Amendment, Applicant submits replacement drawing sheet for FIG. 1 as originally filed. The replacement drawing sheet illustrates bracket 5A, buccal tube 5B, button 5C, sheath 5D, and archwire 5E, which are referred to Applicant's originally-filed disclosure, such as at paragraph [0063]. As provided in 37 C.F.R. 1.83(a), a conventional feature disclosed in the description and claims should be illustrated in the drawing in the form of a graphical drawing symbol or a labeled representation (e.g., a labeled rectangular box) where their detailed illustration is not essential for a proper understanding of the invention. Applicant submits that the bracket 5A, buccal tube 5B, button 5C, sheath 5D, and archwire 5E described in Applicant's description and claims are conventional features for which a detailed illustration is not essential for a proper understanding of the invention.

No new matter has been added by way of the submission of replacement sheet for FIG. 1. Withdrawal of the objection to the figures is respectfully requested.

Objection to the Specification

The Office Action objected to the Abstract because “it contains legal phraseology, the term ‘comprises.’”¹ With the present Amendment, Applicant has amended the Abstract to remove the term, “comprises.” Withdrawal of the objection to the Abstract is respectfully requested in view of the amendment to the Abstract.

Applicant has also amended paragraphs [0021] and [0023] of the disclosure to be consistent with the amendment to FIG. 1. In particular, paragraphs [0021] and [0023] have been amended to reference bracket 5A, buccal tube 5B, button 5C, sheath 5D, and archwire 5E, which are shown in FIG. 1 as amended and are also disclosed at paragraph [0053] of Applicant’s originally-filed disclosure.

Claim Rejection Under 35 U.S.C. § 112, first paragraph

In the final Office Action, claims 38 and 74 were rejected under 35 U.S.C. § 112, first paragraph on the premise that Applicant’s specification does not reasonably provide enablement for a sheath, a button or an archwire. According to the Office Action, “The specification does not describe the planar guide(s) rendered for these appliances and how the planar guide(s) aid the practitioner in placement of such appliances.”² Applicant respectfully disagrees and submits that claims 38 and 74 meet the limitations of 35 U.S.C. § 112, first paragraph.

As an initial matter, Applicant notes that the Office Action has failed to sufficiently address Applicant’s previous arguments with respect to the rejection of 35 U.S.C. § 112, first paragraph in the Response to Arguments section of the final Office Action. Moreover, the Office Action has failed to meet the burden of establishing a reasonable basis for questioning the enablement of the invention of claims 38 and 74. As provided in MPEP §§ 2161.01 and 2164.04, the Examiner must establish a reasonable basis for questioning the adequacy of the disclosure to enable a person of ordinary skill in the art to make and use the claimed invention without resorting to undue experiments. The MPEP provides that the burden can be met by

¹ Final Office Action dated September 17, 2008 at p. 2, item 2.

² Final Office Action dated September 17, 2008 at p. 3, item 5.

providing specific findings and evidence that led the Examiner to conclude that the specification fails to teach how to make and use the claimed invention without undue experimentation. In the present case, however, the final Office Action merely provides a conclusory statement to support the rejection of claims 38 and 74 under 35 U.S.C. § 112, first paragraph.

According to the Office Action, because the specification does not describe how planar guides are rendered for a sheath, button or archwire, or how the planar guides may aid in placement of such appliances, Applicant's specification fails to enable claims 38 and 74. Applicant respectfully submits that the conclusory statement offered by the Office Action does not provide a reasonable basis for questioning the adequacy of Applicant's disclosure with respect to enablement. Moreover, based on the details provided in Applicant's disclosure, such as the operation of modeling software that may generate a planar guide,³ a person of ordinary skill in the art would be able to make and use the claimed invention without resorting to undue experimentation.

Applicant respectfully disagrees with the Office Action and submits that Applicant's specification describes how the planar guides are rendered for a sheath, a button or an archwire. While the specification primarily refers to a bracket, the specification also makes clear that the techniques described therein may be applied to positioning and orienting other types of orthodontic appliances.⁴ Applicant need not separately illustrate rendering of each different type of orthodontic appliance to comply with the enablement requirement of 35 U.S.C. § 112, first paragraph.⁵

To be clear, Applicant's specification provides details regarding how a planar guide may be rendered relative to different surfaces (e.g., a midlateral plane, midsagittal plane, etc.) of an orthodontic appliance, and, in some cases, different surfaces of a tooth (e.g., a occlusal surface or a gingival edge of a tooth)⁶. In addition, Applicant's disclosure provides that modeling software may generate a planar guide within a 3D environment based on a coordinate system associated with a bracket, thereby enabling the modeling software to automatically adjust the 3D location and orientation of the planar guides as the practitioner adjusts the bracket with respect to the

³ See, e.g., Applicant's originally-filed disclosure at paragraph [0063].

⁴ Applicant's originally-filed disclosure at paragraph [0063].

⁵ MPEP § 2164.02.

⁶ Applicant's originally-filed disclosure at paragraph [0031].

tooth.⁷ Regardless of a structure of the orthodontic appliance, e.g., whether the orthodontic appliance is a bracket or a button, the present application makes clear that a coordinate system may be associated with the appliance.

These details regarding use of planar guides to assist in the positioning of brackets may be applied by one skilled in the art to generate planar guides that assist a practitioner in positioning orthodontic appliances other than brackets without undue experimentation. For example, Applicant's disclosure describes a mesial planar guide that may be rendered parallel to and equidistant from a midsagittal plane of a bracket being placed. A sheath, button, and archwire may have a midsagittal plane, which is a well-known term that refers to a plane that divides an object into right and left halves.⁸ Thus, one skilled in the art would recognize that the mesial planar guide may be rendered parallel to the midsagittal plane of the respective orthodontic appliance. As another example, Applicant's disclosure describes a distal planar guide that penetrates a distal edge of a digital representation of a tooth.⁹ Thus, regardless of the type of orthodontic appliance, one skilled in the art would recognize that a planar guide that penetrates a distal edge of a tooth may also be rendered to aid in the placement of the orthodontic appliance relative to a digital representation of the tooth.

The Office Action also questioned how the planar guides aid the practitioner in placement of a sheath, button, and archwire. However, the disclosure related to brackets in Applicant's disclosure indicates how planar guides may aid the practitioner in placement of a sheath, button, and archwire. Planar guides associated with a bracket may assist a practitioner in achieving proper appliance placement of a bracket according to anatomical features of the teeth.¹⁰ Just as midlateral, midfrontal, and midsagittal planar guides associated with a bracket may be useful in dissecting the tooth and visualizing cross-sections of the tooth,¹¹ midlateral, midfrontal, and midsagittal planar guides associated with a sheath, a button or an archwire may be useful in dissecting the tooth and visualizing cross-sections of the tooth. For example, in some embodiments, the planar guides may allow a practitioner to precisely position and orient a

⁷ Applicant's originally-filed disclosure at paragraph [0023].

⁸ See, e.g., http://www.biology-online.org/dictionary/Midsagittal_plane and http://en.wikipedia.org/wiki/Sagittal_plane.

⁹ Applicant's originally-filed disclosure at paragraph [0057].

¹⁰ Applicant's originally-filed disclosure at paragraph [0034].

¹¹ Applicant's originally-filed disclosure at paragraph [0033].

bracket on a tooth by effectively framing a tooth. In particular, the planar guides may help position the bracket relative to a perceived midsagittal plane of a tooth or an occlusal plane of a dental arch.¹² One skilled in the art would recognize that the anatomical features of a tooth may also be important to identify for placing a sheath, a button or an archwire relative to a dental arch.

As described in Applicant's disclosure, a planar guide generally visually aids a practitioner in the placement of an orthodontic appliance within a 3D environment by helping the practitioner visually determine the distance between the planar guide and other objects within the 3D environment, such as a surface of a tooth. Regardless of the type of orthodontic appliance, an indication of the relative positioning between a planar guide and an object within a 3D environment may be beneficial. No undue experimentation is necessary to determine how a planar guide may provide a visual aid to a practitioner in the placement of sheath, button or archwire within a 3D environment.

Based on Applicant's disclosure, one skilled in the art would be able practice a method that includes displaying a planar guide within a 3D environment as a visual aid to a practitioner in the placement of a sheath, button, and archwire relative to a digital representation of a dental arch without undue experimentation. Similarly, one skilled in the art would be able to make and use modeling software that includes a user interface that displays a planar guide within a 3D environment as a visual aid to a practitioner in the placement of a sheath, button, and archwire relative to the dental arch without undue experimentation.

For at least these reasons, Applicant's specification enables claims 38 and 74. Reconsideration and withdrawal of the rejection is respectfully requested.

Claim Rejection Under 35 U.S.C. § 112, second paragraph

In the Office Action, claims 1–38, 44–50, 64, 66, 78, 80, and 83–86 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the Office Action stated that, “It is unclear as to what a midsagittal plane, a midlateral plane, a midfrontal plane, and an occlusal-gingival axis of the orthodontic appliance are.”¹³ Applicant

¹² Applicant's originally-filed disclosure at paragraph [0032].

¹³ Final Office Action dated September 17, 2008 at p. 4, item 7.

notes that only claims 5–11, 28, 30, 44–50, 64, 66, and 78 recite midsagittal plane, a midlateral plane, a midfrontal plane, occlusal-gingival axis of an orthodontic appliance. Thus, Applicant respectfully requests clarification of the grounds on which the remaining claims, specifically claims 1–4, 12–27, 29, 31–38, 80, and 83–86, are rejected under 35 U.S.C. § 112, second paragraph.

Applicant's claims 1–38, 44–50, 64, 66, 78, 80, and 83–86 are definite and meet the requirements of 35 U.S.C. § 112, second paragraph. Applicant respectfully maintains the arguments presented in the Amendment filed on April 10, 2008 with respect to the rejection of claims 1–38, 44–50, 64, 66, 78, 80, and 83–86 under 35 U.S.C. § 112, second paragraph.

For at least the reasons discussed in the Amendment filed on April 10, 2008, Applicant submits that claims 1–38, 44–50, 64, 66, 78, 80, and 83–86 particularly point out and distinctly claim the subject matter, as required by 35 U.S.C. 112, second paragraph. Reconsideration and withdrawal of the rejection is respectfully requested.

Claim Rejection Under 35 U.S.C. §§ 102(b) and 103(a)

In the final Office Action, claims 1–4, 10, 12, 13, 18, 19, 31–35, 37, 38, 39–43, 49, 51–55, 73–78, and 80–82 were rejected under 35 U.S.C. § 102(b) as being anticipated by Chapoulaud. In addition, claims 5–9, 11, 14–17, 20–28, 36, 44–48, 50, 56–64, 67–72, and 83–86 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chapoulaud, and claims 29, 30, 65, 66, and 79 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chapoulaud in view of Kopelman et al. (U.S. Patent Application Publication No. 2003/014509, hereinafter “Kopelman”).

Applicant respectfully traverses the rejection of the claims. Chapoulaud, alone or in combination with Kopelman, fails to disclose or suggest each and every feature of the claimed invention, as required by 35 U.S.C. §§ 102(b) and 103(a), and provides no teaching that would have suggested the desirability of modification to include such features.

Independent Claims 1, 4, 39, and 75

For example, Chapoulaud fails to disclose or suggest a method comprising displaying a digital representation of a tooth of a dental arch within a three-dimensional (3D) environment, and, while displaying the digital representation of the tooth of the dental arch, displaying a two-dimensional planar guide within the 3D environment as a visual aid to a practitioner in the placement of an orthodontic appliance relative to the tooth of the dental arch, where the two-dimensional planar guide is displayed separately from the digital representation of the tooth, as recited by Applicant's independent claims 1 and 4.

In support of the rejection of the claims, the Office Action generally stated that Chapoulaud discloses displaying a planar guide within a 3D environment while displaying a digital representation of a tooth of a dental arch.¹⁴ The Office Action further stated that in Chapoulaud, "the planar guide receives input from the practitioner moving the placement of the orthodontic appliance relative to the tooth in the 3-D environment" and cited to paragraphs 57 and 58 of Chapoulaud.¹⁵ At paragraphs 57 and 58, Chapoulaud discloses a computer 30 that receives input from an operator. If the Office Action is characterizing the computer 30 as a planar guide, Applicant respectfully submits that the Office Action appears to be misinterpreting Applicant's claims.

The methods of Applicant's independent claims 1 and 4 require displaying a digital representation of a tooth within a 3D environment and displaying a two-dimensional planar guide within the same 3D environment. Thus, the digital representation of the tooth and the planar guide recited in claims 1 and 4 are objects that are displayed within a 3D environment. In contrast, the computer 30 disclosed by Chapoulaud is not an object that is displayed, much less displayed within the same 3D environment as the digital representation of the tooth. Moreover, the computer 30 disclosed by Chapoulaud does not have a location that is based on a position of an orthodontic appliance within the 3D environment, as further required by Applicant's claims 1 and 4. Chapoulaud fails to disclose or even suggest that the computer 30 or any display provided by the computer changes position based on a position of an orthodontic appliance within the 3D environment.

¹⁴ Final Office Action dated September 17, 2008 at p. 4, item 9.

¹⁵ Final Office Action dated September 17, 2008 at p. 5, item 9.

As noted above, the Office Action asserted that Applicant's claims were anticipated by Chapoulaud because Chapoulaud discloses a planar guide that "receives input from the practitioner moving the placement of the orthodontic appliance relative to the tooth in the 3-D environment."¹⁶ However, Applicant's claims do not recite a planar guide that receives input from a practitioner. Instead, Applicant's claims recite a planar guide that is rendered at a location that is based on a position of an orthodontic appliance within a 3D environment. For example, claim 1 specifies that, within the 3D environment, the location of the planar guide changes "as the practitioner moves an orthodontic appliance relative to a digital representation of a tooth." It is clear that claim 1 requires the planar guide to be displayed within a 3D environment.

Chapoulaud fails to disclose or suggest any planar guide that is rendered at a location that is based on a position of an orthodontic appliance within a 3D environment. While Chapoulaud discloses illustrating brackets, an archwire, and vector images of teeth on a screen,¹⁷ Chapoulaud fails to disclose or suggest displaying a planar guide in addition to the brackets, an archwire, and vector images of teeth as a visual aid to a practitioner in a placement of an orthodontic appliance relative to a tooth, as required by independent claims 1 and 4.

In further support of the rejection of the claims, the Office Action generally stated that stated that FIG. 5 and paragraph [0090] of Chapoulaud discloses rendering a two-dimensional planar guide at a location that is based on a position of the appliance in a 3D environment.¹⁸ Applicant respectfully disagrees. FIG. 5 of Chapoulaud illustrates 3D images and vector images teeth of a patient in their pretreatment positions.¹⁹ FIG. 5 does not illustrate a two-dimensional planar guide, much less a planar guide that has a location that is based on a position of an orthodontic appliance within the 3D environment, as recited by Applicant's claim 1. If the Office Action is characterizing the vector images of the teeth as planar guides, Applicant respectfully disagrees that the vector tooth images are planar guides as recited in claims 1 and 4 for at least the reasons discussed in the Amendment filed on April 10, 2008. For example, claims 1 and 4 specify that a method includes displaying both a digital representation of a tooth of a dental arch and a planar guide within the same 3D environment. Neither FIG. 5 of Chapoulaud, nor any

¹⁶ Final Office Action dated September 17, 2008 at p. 5, item 9.

¹⁷ Chapoulaud at paragraph [0091].

¹⁸ Final Office Action dated September 17, 2008 at p. 5, item 9.

¹⁹ Chapoulaud at paragraph [0084].

other figures of Chapoulaud, illustrate a digital representation of a tooth, a two-dimensional planar guide, and an orthodontic appliance, as required by Applicant's claims 1 and 4.

In contrast to the vector images of the teeth disclosed by Chapoulaud, the invention recited in independent claims 1 and 4 aids a practitioner in the placement of an orthodontic object relative to a tooth of a dental arch within a 3D environment by displaying both the tooth and the planar guide. Because the location of the planar guide changes as the practitioner moves an orthodontic appliance relative to the tooth, the planar guide helps provide a good visual indication of the position of the orthodontic appliance relative to another displayed object, i.e., the tooth.²⁰ Chapoulaud, however, fails to disclose displaying a separate tooth and a planar guide and also fails to teach or suggest *as the practitioner moves the orthodontic appliance relative to the tooth within the 3D environment, rendering the planar guide at a location that is based on a position of the orthodontic appliance within the 3D environment*. Accordingly, Chapoulaud does not disclose the invention of Applicant's independent claims 1 and 4. Additional arguments directed to this point may be found in Applicant's Amendment filed on April 10, 2008, which Applicant incorporates herein in its entirety.

The Office Action also cited paragraph [0090] of Chapoulaud to support the assertion that Chapoulaud discloses a planar guide in accordance with Applicant's independent claims 1 and 4. At paragraph [0090], Chapoulaud discloses a computer 30b that designs an appliance based on tooth positions determined by an orthodontist via the computer 30b, and fails to disclose or suggest displaying both a digital representation of a tooth and a planar guide, where the planar guide is rendered at a location that is based on a position of the orthodontic appliance within the 3D environment.²¹ Chapoulaud discloses that an archwire may be designed to lie in an archwire plane through the teeth. This archwire plane, however, may not reasonably be characterized as a planar guide. For example, Chapoulaud fails to disclose that this archwire plane is displayed. In addition, Chapoulaud fails to disclose or suggest that the archwire plane is rendered at a location that is based on a position of the orthodontic appliance within the 3D environment, as required by Applicant's claims 1 and 4.

²⁰ See, e.g., Applicant's originally-filed disclosure at paragraph [0008].

²¹ See also Chapoulaud at paragraph [0089].

For at least the reasons discussed above with respect to independent claim 1, the cited references fail to disclose or suggest a system comprising a computing device, and modeling software executing on the computing device, where the modeling software comprises a rendering engine that renders a digital representation of a tooth of a dental arch within a three-dimensional (3D) environment, and a user interface that displays the digital representation of the tooth of the dental arch while displaying a two-dimensional planar guide within the 3D environment as a visual aid to a practitioner in a placement of an orthodontic appliance relative to the dental arch within the 3D environment, where the rendering engine displays the planar guide separately from the digital representation of the tooth, and wherein, as the practitioner moves the orthodontic appliance relative to the tooth within the 3D environment, the rendering engine renders the planar guide at a location based on a position of the orthodontic appliance within the 3D environment, as required by Applicant's independent claim 39.

In addition, for at least the reasons discussed above with respect to independent claim 1, Chapoulaud also fails to disclose or suggest each and every limitation of independent claim 75. Claim 75 recites a computer-readable medium comprising instructions for causing a programmable processor to render a digital representation of a tooth within a three-dimensional (3D) environment, and, while displaying the digital representation of the tooth, display a two-dimensional planar guide within the 3D environment as a visual aid to a practitioner in the placement of an orthodontic appliance relative to the tooth within the 3D environment, where the planar guide is displayed separately from the digital representation of the tooth, and where the instructions cause the programmable processor to display the planar guide by, as the practitioner moves the orthodontic appliance relative to the tooth within the 3D environment, rendering the planar guide at a location based on a position of the orthodontic appliance within the 3D environment.

Dependent Claims 2, 3, 5-38, 40-74, and 76-82

Claims 2, 3, 5-38, 40-74, and 76-82 depend from one of independent claims 1, 4, 39, and 75, and are patentable over the cited references for at least the reasons given above with respect to the independent claims. Claims 2, 3, 5-38, 40-74, and 76-82 recite additional limitations that are neither disclosed nor suggested by Chapoulaud or the other cited art. In the Amendment filed on April 10, 2008, Applicant addressed some of the dependent claims for purposes of illustration. Applicant maintains the arguments presented in the Amendment filed on April 10, 2008 with respect to the rejection of the dependent claims, as well as the independent claims.

For at least the reasons discussed above and in the Amendment filed on April 10, 2008, the Examiner has failed to establish a *prima facie* case for non-patentability of Applicant's claims 1-86 under 35 U.S.C. §§ 102(b) and 103(a). Reconsideration and withdrawal of the rejection of the claims is requested.

CONCLUSION

All claims in this application are in condition for allowance. Applicant respectfully requests reconsideration and prompt allowance of all pending claims. Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

Date:

By:

December 17, 2008

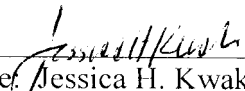
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